Supporting Information

The effect of nanofibrous Al_2O_3 aspect ratio on Fischer-Tropsch synthesis over cobalt catalysts

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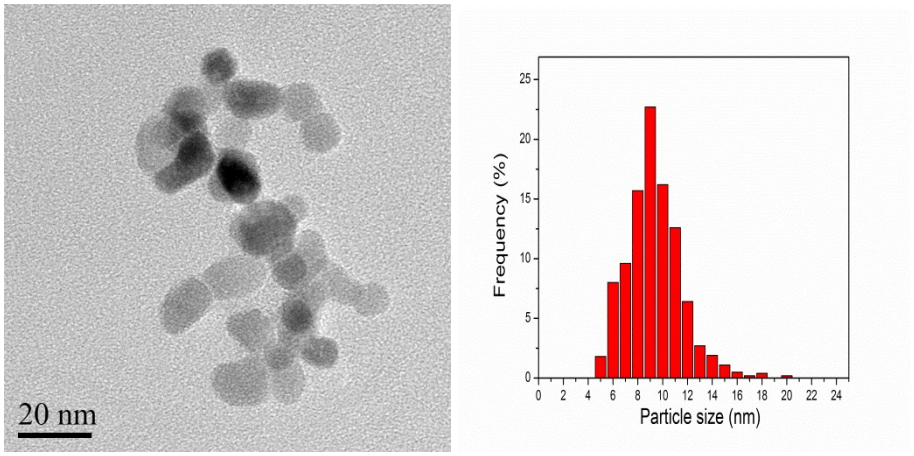

Figure S1. TEM images Co_3O_4 nanoparticles and the histograms of the Co_3O_4 particle size.

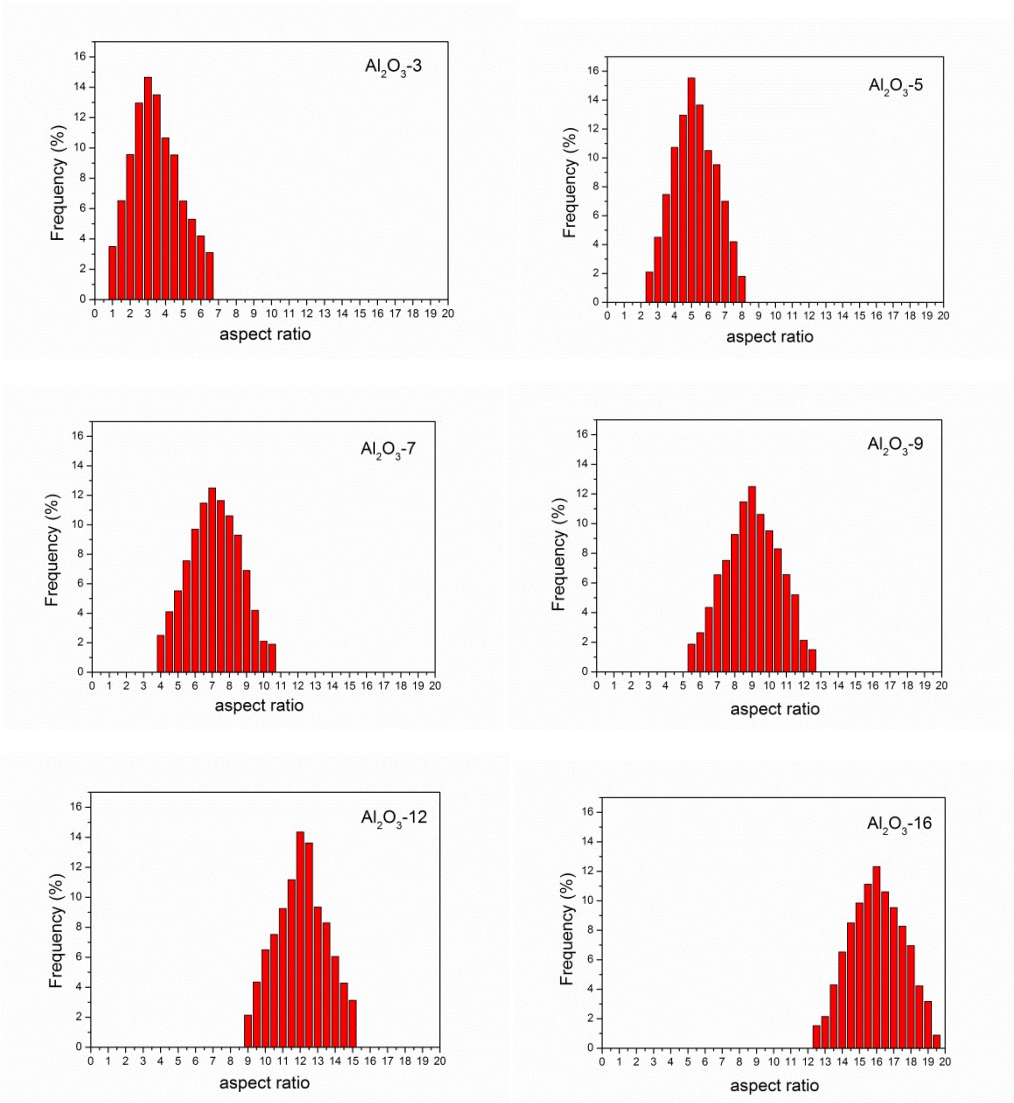

Figure S2. The histograms of the average aspectio of nanofibrous alumina.

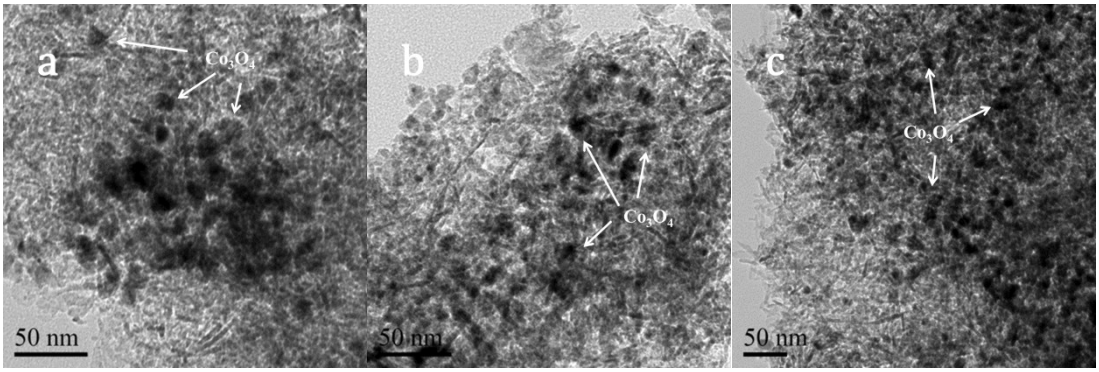

Figure S3. TEM images of the catalysts (Co_3O_4 highlighted by white arrows): (a) Co_p/Al_2O_3-9; (b) Co_p/Al_2O_3-12 and (c) Co_p/Al_2O_3-16.

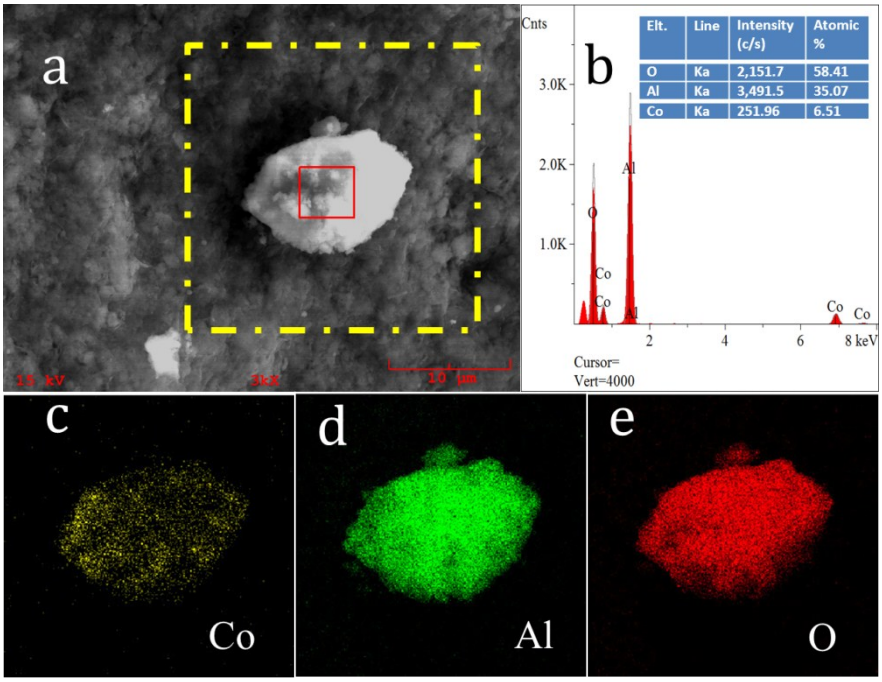

Figure S4. SEM-EDS elemental mapping images for Co, Al, and O of the corresponding region (yellow frame) of Co_p/Al_2O_3-16.

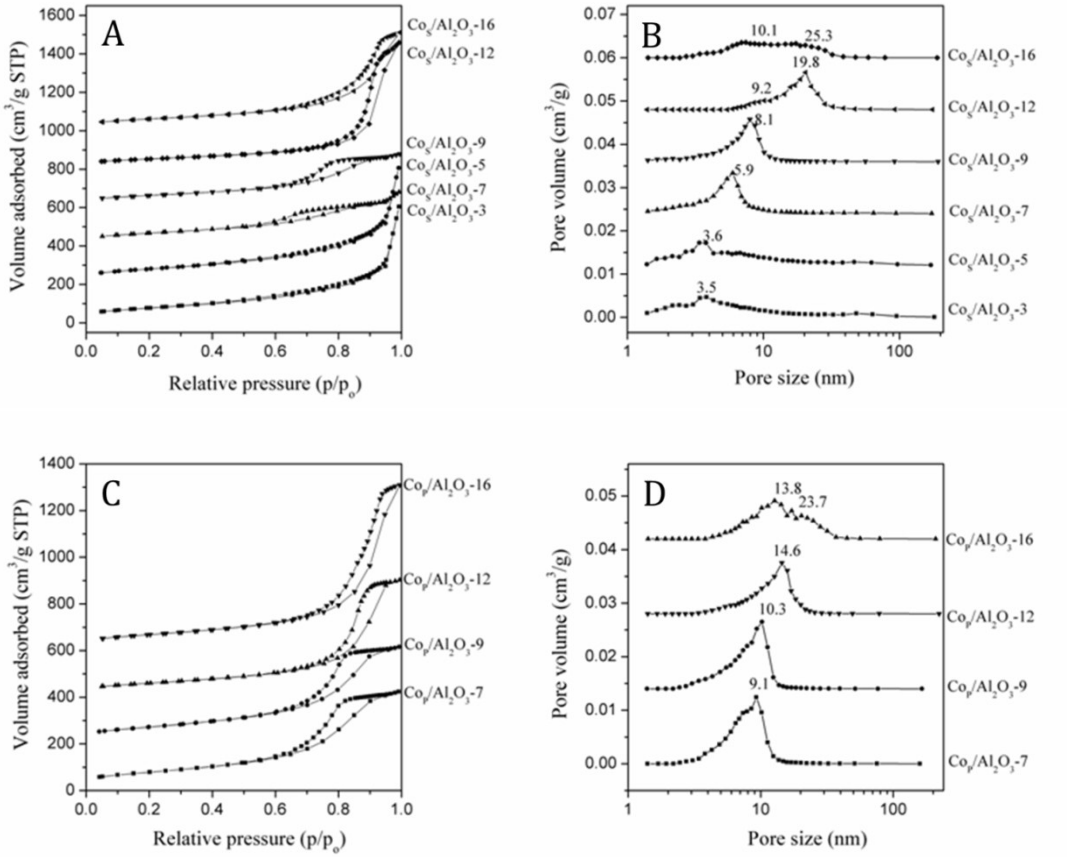

Figure S5. Nitrogen adsorption/desorption isotherms (A for impregnated catalysts, C for rearranged catalysts) and pore size distributions of the catalysts (B for impregnated catalysts, D rearranged catalysts).

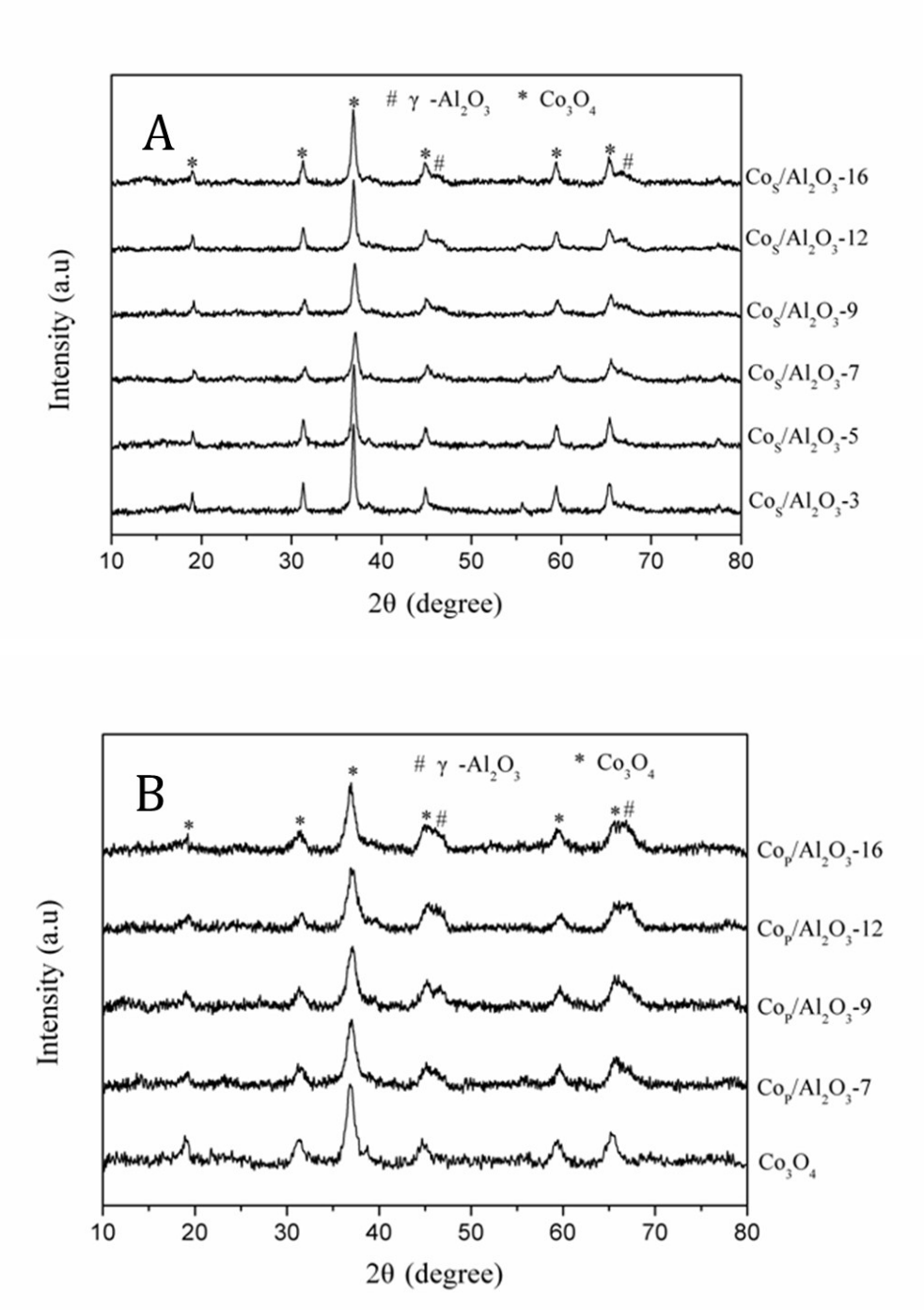

Figure S6. Powder XRD patterns of the catalysts and prepared Co_3O_4 nanoparticles.

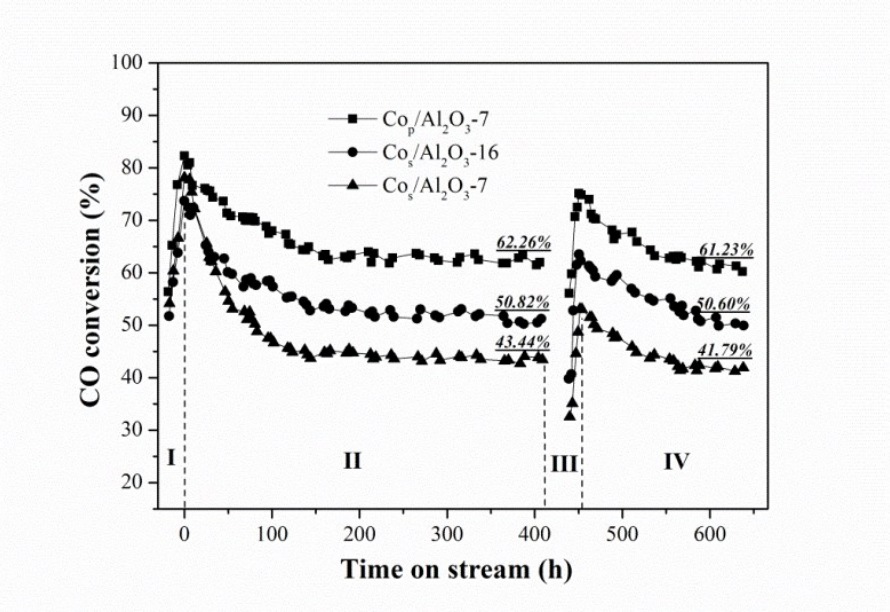

Figure S7. CO conversion as a function of time on stream. After reduced, the reactor temperature was increased slowly to 503 K (Period I), run at 1.0MPa, 503K, GHSV = 3.2 SL•g^{-1}•h^{-1}, 2.9 SL•g^{-1}•h^{-1} and 6.5 SL•g^{-1}•h^{-1} for catalyst Co$_S$/Al$_2$O$_3$-7, Co$_S$/Al$_2$O$_3$-16 and Co$_p$/Al$_2$O$_3$-7, respectively (Period II and IV), re-reduced treatment in flowing N_2/H_2 (1:1, 6 NL h^{-1} g^{-1}) for 10 h at 503 K.

Table S1. The synthesis condition of nanofibers alumina with various aspect ratios.

Sample	Amount of acetic acid added (mL)	Aging temperature (K)	Average aspect ratio of sample
Al_2O_3-3	1.0	333	3
Al_2O_3-5	1.0	353	5
Al_2O_3-7	0.5	353	7
Al_2O_3-9	0	353	9
Al_2O_3-12	0	373	12

Table S2. Nitrogen adsorption results and crystallite size of the nanofibrous Al_2O_3 supports.

sample	BJH pore size (nm)	Average pore size[a] (nm)	S_{BET} ($m^2 \cdot g^{-1}$)	Pore volume （$cm^3 \cdot g^{-1}$）	Crystallites size[b] (nm)
Al_2O_3-3	3.8, 6.5	16.4	426	1.75	3.5
Al_2O_3-5	4.9, 9.2	18.2	419	1.90	3.8
Al_2O_3-7	7.8, 12.3	24.1	330	1.99	4.6
Al_2O_3-9	9.6, 17.7	27.7	309	2.14	4.9
Al_2O_3-12	13.2, 20.5	26.1	279	1.82	6.0
Al_2O_3-16	15.6, 25.9	27.7	261	1.80	6.7

[a] Average pore size = 4(Pore volume/S_{BET})

[b] Average diameter of Al_2O_3 crystallite, obtained by XRD measurement.